

Illustrating Student Achievement

Using National Assessment of Educational Progress Questions:

Grade 4

Number and Operations in Base Ten Domain

The Montana Office of Public Instruction (OPI) adopted new standards for language arts and mathematics in November 2011. The new standards will be implemented in the 2013-2014 school year with the Smarter Balanced (SBAC) assessment taking place in the spring of 2014.

This document uses National Assessment of Education Progress (NAEP) questions that seem to have a close alignment with the new standards to illustrate or suggest current levels of student achievement for the new standards. It is not intended to make any predictions about how students will do on a new assessment but may have instructional implications in terms of showing students' strengths and weaknesses. NAEP releases some items after each NAEP administration; performance data is given for the nation and states for each released item. Since 2003, every state has participated in the grade 4 and grade 8 NAEP mathematics and language arts assessments, which are given every other year. SBAC released practice tests matching the Number and Operations in Base Ten Domain have been included in this document as another example to illustrate the standards. There are no NAEP 2013 released questions as examples but these questions may be accessed via the [NAEP Questions Tool \(NQT\)](#).

This work has been made available through the **National NAEP Year Projects (NNYP)**. This document parallels the work of Alaska's NAEP state coordinator. The following jurisdictions have made this information possible: Alaska, Iowa, New York, Florida, Oregon and the District of Columbia. For more information and resources, please visit:

- [Alaska Department of Education](#)
- [Iowa Department of Education](#)
- [NYC Department of Education](#)
- [Florida Department of Education](#)
- [Oregon Department of Education](#)
- [District of Columbia](#)
- [AIR: Examining the Content and Context of the Common Core State Standards: A First Look at Implications for the National Assessment of Educational Progress](#)



Montana
Office of Public Instruction
Denise Juneau, State Superintendent

A note about NAEP performance: NAEP rates multiple-choice or constructed-response questions scored either right or wrong as “easy” if answered correctly by 60% or more of students, “medium” is answered correctly by 40 to 59%, or “hard” if answered correctly by fewer than 40%.

Montana Common Core Standards:

Generalize place value understanding for multi-digit whole numbers.

- **4.NBT.1.** Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.*

Generalize place value understanding for multi-digit whole numbers.

- **4.NBT.2.** Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on the value of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.

Generalize place value understanding for multi-digit whole numbers.

- **4.NBT.3.** Use place value understanding to round multi-digit whole numbers to any place using a variety of estimation methods; be able to describe, compare, and contrast solutions.

Use place value understanding and properties of operations to perform multi-digit arithmetic.

- **4.NBT.4.** Fluently add and subtract multi-digit whole numbers using any algorithm. Verify the reasonableness of the results.

Use place value understanding and properties of operations to perform multi-digit arithmetic.

- **4.NBT.5.** Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000. A range of algorithms may be used.)

Use place value understanding and properties of operations to perform multi-digit arithmetic.

- **4.NBT.6.** Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000. A range of algorithms may be used.)

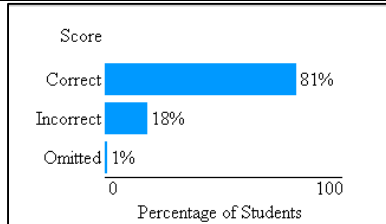
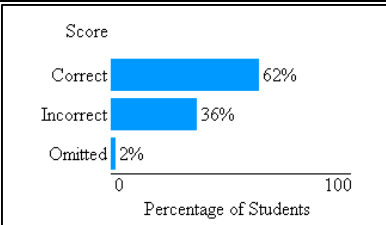
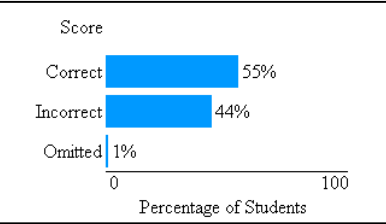
Use the four operations with whole numbers to solve problems.

- **4.OA.2.** Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.
- **4.OA.3.** Solve multistep word problems within cultural contexts, including those of Montana American Indians, posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

For more information on the MCCS- Grade Level Standards by Domain and Cluster, please visit:

http://opi.mt.gov/Curriculum/montCAS/MCCS/index.php?gpm=1_4

Year	Grade	Block	#	Type	Difficulty	Content Area	% Correct	Item	Description	Iowa CCSS Code	Alaska CCSS Code
2003	4	10	3	MC	Easy	Number sense, properties, and operations	76.6	Item1	Translate large number in words to numeral	4.NBT.2	4.NBT.2
2003	4	10	15	MC	Hard	Number sense, properties, and operations	30.59	Item2	Estimate solution of a multi-step word problem	4.MD.2	4.NBT.3. & 4.OA.3
2003	8	6	19	MC	Hard	Number sense, properties, and operations	38.6	Item3	Use proportional reasoning to find the distance between two towns along a line	3.OA.2	4.NBT.6. & 4.OA.2
2005	4	12	1	MC	Easy	Number properties and operations	86.15	Item4	Identify a number given in expanded notation	4.NBT.2	4.NBT.2
2007	4	9	2	MC	Easy	Number properties and operations	81.04	Item5	Find a sum based on place value	4.NBT.4	4.NBT.1.
2007	4	11	5	MC	Easy	Number properties and operations	61.95	Item6	Use place value to determine amount of increase	4.NBT.4	4.NBT.1.
2007	4	11	17	MC	Easy	Number properties and operations	83.72	Item7	Order four-digit numbers from smallest to largest	4.NBT.2	4.NBT.2.
2009	4	10	1	MC	Easy	Number properties and operations	67.25	Item8	Subtract two-digit number from three-digit number	2.NBT.7	4.NBT.4.
2009	4	10	12	MC	Medium	Number properties and operations	58.53	Item9	Divide a three-digit number by a one-digit number	4.NBT.6	4.NBT.6.
2011	4	8	7	MC	Medium	Number properties and operations	53.12	Item10	Solve a story problem involving multiplication (calculator available)	4.NBT.5	4.NBT.5 & 4.OA.2
2011	4	9	2	MC	Medium	Number properties and operations	55.34	Item11	Use place value to find a sum	4.NBT.4	4.NBT.1.
2011	4	9	5	MC	Easy	Number properties and operations	79.92	Item12	Add 5-digit number and 6-digit number	4.NBT.4	4.NBT.4.
2011	4	9	8	MC	Easy	Number properties and operations	74.35	Item13	Compute the difference of two 4-digit numbers	4.NBT.4	4.NBT.4
2011	4	12	6	MC	Medium	Number properties and operations	52.23	Item14	Multiply two 2-digit whole numbers	4.NBT.5	4.NBT.5
#	#	#	#	#	#	#	#	Item15	SBAC Practice Item (Item 11)	#	4.NBT.2.
#	#	#	#	#	#	#	#	Item16	SBAC Practice Item (Item 9)	#	4.NBT.4

NAEP Content Area: Number properties and operations Question: Find a sum based on place value. Gr.4. 2007. Item5. Iowa CCSS classification: 4.NBT.4; Alaska CCSS classification: 4.NBT.1.	National Data:	MT Data:								
What number is 10 more than 5,237? A. 5,238 B. 5,247 C. 5,337 D. 6,237	 <table><caption>National Data for Item 5</caption><thead><tr><th>Score</th><th>Percentage of Students</th></tr></thead><tbody><tr><td>Correct</td><td>81%</td></tr><tr><td>Incorrect</td><td>18%</td></tr><tr><td>Omitted</td><td>1%</td></tr></tbody></table>	Score	Percentage of Students	Correct	81%	Incorrect	18%	Omitted	1%	87% correct Answer: B
Score	Percentage of Students									
Correct	81%									
Incorrect	18%									
Omitted	1%									
NAEP Content Area: Number properties and operations Question: Use place value to determine amount of increase. Gr.4. 2007. Item6. Iowa CCSS classification: 4.NBT.4; Alaska CCSS classification: 4.NBT.1.	National Data:	MT Data:								
By how much will the value of the number 4,372 increase if the 3 is replaced with a 9? A. 6 B. 60 C. 600 D. 6,000	 <table><caption>National Data for Item 6</caption><thead><tr><th>Score</th><th>Percentage of Students</th></tr></thead><tbody><tr><td>Correct</td><td>62%</td></tr><tr><td>Incorrect</td><td>36%</td></tr><tr><td>Omitted</td><td>2%</td></tr></tbody></table>	Score	Percentage of Students	Correct	62%	Incorrect	36%	Omitted	2%	62% correct Answer: C
Score	Percentage of Students									
Correct	62%									
Incorrect	36%									
Omitted	2%									
NAEP Content Area: Number properties and operations Question: Use place value to find a sum. Gr.4. 2011. Item11. Iowa CCSS classification: 4.NBT.4; Alaska CCSS classification: 4.NBT.1.	National Data:	MT Data:								
What number is 10,000 more than 333,333? A. 333,433 B. 334,333 C. 343,333 D. 433,333	 <table><caption>National Data for Item 11</caption><thead><tr><th>Score</th><th>Percentage of Students</th></tr></thead><tbody><tr><td>Correct</td><td>55%</td></tr><tr><td>Incorrect</td><td>44%</td></tr><tr><td>Omitted</td><td>1%</td></tr></tbody></table>	Score	Percentage of Students	Correct	55%	Incorrect	44%	Omitted	1%	59% correct Answer: C
Score	Percentage of Students									
Correct	55%									
Incorrect	44%									
Omitted	1%									
SBAC Practice Test Item, Item15										
Alaska CCSS classification: 4.NBT.2.										

To play a game, each player must make a 5-digit **even** number. The player with the greatest number is the winner of the game. These digit cards show the number made by player 1.



These cards show which numbers are left.



Use the remaining cards to create a 5-digit **even** number that will win the game.

For this item, a full-credit response (2 points) includes:

- a 5-digit even number greater than 87,654 containing the numbers 0, 1, 2, 3, and 9

For example,

- the value 93,210

NAEP Content Area: Number properties and operations

Question: Order four-digit numbers from smallest to largest. Gr.4. 2007. Item7.

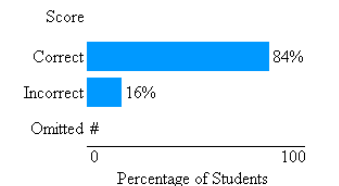
Iowa CCSS classification: 4.NBT.2; **Alaska CCSS classification:** 4.NBT.2.

Which set of numbers is listed from the smallest to the largest?

- A. 1,001 1,100 1,011
- B. 2,200 2,022 2,020
- C. 3,030 3,003 3,300
- D. 4,004 4,040 4,044

National Data:

MT Data:



86% correct

Answer: D

NAEP Content Area: Number properties and operations

Question: Identify a number given in expanded notation. Gr.4. 2005. Item4.

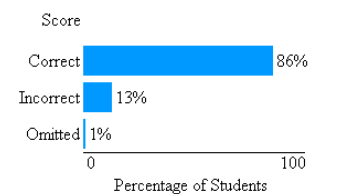
Iowa CCSS classification: 4.NBT.2; **Alaska CCSS classification:** 4.NBT.2.

Which of these is equal to $8,000 + 800 + 8$?

- A. 8,088
- B. 8,808
- C. 8,880
- D. 8,888

National Data:

MT Data:



87% correct

Answer: B

NAEP Content Area: Number sense, properties, and operations

Question: Translate large number in words to numeral. Gr.4. 2003. Item1

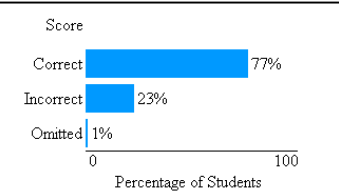
Iowa CCSS classification: 4.NBT.2; **Alaska CCSS classification:** 4.NBT.2.

Ron was listening to the radio and heard, "One hundred twenty-four thousand sixty-five books have been donated to the library." What is this number?

- A. 12,465
- B. 124,065
- C. 124,650
- D. 100,024,065

National Data:

MT Data:



76% correct

Answer: B

NAEP Content Area: Number sense, properties, and operations

Question: Estimate solution of a multi-step word problem. Gr.4. 2003. Item2. Iowa CCSS classification: 4.MD.2; Alaska CCSS classification: 4.NBT.3. & 4.OA.3		National Data:	MT Data:
Estela wants to buy 2 notebooks that cost \$2.79 each, including tax. If she has one-dollar bills and no coins, how many one-dollar bills does she need? A. 3 B. 4 C. 5 D. 6		<div><div>Score</div><div>Correct31%</div><div>Incorrect68%</div><div>Omitted2%</div><div>0100</div><div>Percentage of Students</div></div>	31% correct Answer: D
SBAC Practice Test Item, Item16			
Alaska CCSS classification: 4.NBT.4.			
<div><div>9</div><div>Drag one number into each box to complete the subtraction problem shown.</div></div> <div><div>0</div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div></div> <div><div>50□6</div><div>-□48□</div><div>16□8</div></div>	<div>For this item, a full-credit response (1 point) includes:</div> <div><div>• the correct equation</div><div>5096</div><div>-3488</div><div>1608</div></div>		
NAEP Content Area: Number properties and operations Question: Add 5-digit number and 6-digit number. Gr.4. 2011. Item12. Iowa CCSS classification: 4.NBT.4; Alaska CCSS classification: 4.NBT.4.		National Data:	MT Data:
Add 20,000 + 790,000 = A. 792,000 B. 810,000 C. 811,000 D. 990,000		<div><div>Score</div><div>Correct80%</div><div>Incorrect19%</div><div>Omitted1%</div><div>0100</div><div>Percentage of Students</div></div>	81% correct Answer: B
NAEP Content Area: Number properties and operations Question: Compute the difference of two 4-digit numbers. Gr.4. 2011. Item13. Iowa CCSS classification: 4.NBT.4; Alaska CCSS classification: 4.NBT.4.		National Data:	MT Data:
Subtract 6,090 - 4,843 A. 1,147 B. 1,247 C. 2,257 D. 2,853		<div><div>Score</div><div>Correct74%</div><div>Incorrect25%</div><div>Omitted1%</div><div>0100</div><div>Percentage of Students</div></div>	83% correct Answer: B
NAEP Content Area: Number properties and operations			

Question: Subtract two-digit number from three-digit number. Gr.4. 2009. Item8. Iowa CCSS classification: 2.NBT.7; Alaska CCSS classification: 4.NBT.4.	National Data:	MT Data:
<div>301 −75</div> <div>A. 226 B. 235 C. 236 D. 374</div>	<div><div>Score</div><div>Correct67%</div><div>Incorrect31%</div><div>Omitted2%</div><div>0100</div><div>Percentage of Students</div></div>	<div>72% correct</div> <div>Answer: A</div>
NAEP Content Area: Number properties and operations Question: Multiply two 2-digit whole numbers. Gr.4. 2011. Item14. Iowa CCSS classification: 4.NBT.5; Alaska CCSS classification: 4.NBT.5.	National Data:	MT Data:
<div>74 x 16</div> <div>A. 90 B. 518 C. 1,164 D. 1,184</div>	<div><div>Score</div><div>Correct52%</div><div>Incorrect43%</div><div>Omitted5%</div><div>0100</div><div>Percentage of Students</div></div>	<div>48% correct</div> <div>Answer: D</div>
NAEP Content Area: Number properties and operations Question: Solve a story problem involving multiplication (calculator available). Gr.4. 2011. Item10. Iowa CCSS classification: 4.NBT.5; Alaska CCSS classification: 4.NBT.5. & 4.OA.2	National Data:	MT Data:
<div>Patty expects that each tomato plant in her garden will bear 24 tomatoes. If there are 6 tomato plants in her garden, how many tomatoes does she expect?</div> <div>A. 4 B. 18 C. 30 D. 144</div>	<div><div>Score</div><div>Correct53%</div><div>Incorrect46%</div><div>Omitted1%</div><div>0100</div><div>Percentage of Students</div></div>	<div>55% correct</div> <div>Answer: D</div>

NAEP Content Area: Number properties and operations		National Data:	MT Data:
<p>Question: Divide a three-digit number by a one-digit number. Gr.4. 2009. Item9.</p> <p>Iowa CCSS classification: 4.NBT.6; Alaska CCSS classification: 4.NBT.6.</p>			
<p>Divide</p> <div><div>5</div><div>476</div></div> <p>A. 85 R1</p> <p>B. 95 R1</p> <p>C. 96</p> <p>D. 135 R1</p>		<div><div>Score</div><div>Correct59%</div><div>Incorrect39%</div><div>Omitted3%</div><div>0100</div><div>Percentage of Students</div></div>	<p>57% correct</p> <p>Answer: B</p>
NAEP Content Area: Number sense, properties, and operations		National Data:	MT Data:
<p>Question: Use proportional reasoning to find the distance between two towns along a line. Gr.4. 2003. Item3.</p> <p>Iowa CCSS classification: 3.OA.2; Alaska CCSS classification: 4.NBT.6. & 4.OA.2</p>			
<div><div>Bay CityExtonYardville</div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div> <p>On the road shown above, the distance from Bay City to Exton is 60 miles. What is the distance from Bay City to Yardville?</p> <p>A. 45 miles</p> <p>B. 75 miles</p> <p>C. 90 miles</p> <p>D. 105 miles</p>		<div><div>Score</div><div>Correct24%</div><div>Incorrect75%</div><div>Omitted1%</div><div>0100</div><div>Percentage of Students</div></div>	<p>41% correct</p> <p>Answer: D</p>